

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Exam: Function Reflections (practice version 0)

1. Let function  $f$  be defined by the polynomial below:

$$f(x) = -3x^4 - 9x^3 - 5x^2 - 4x - 6$$

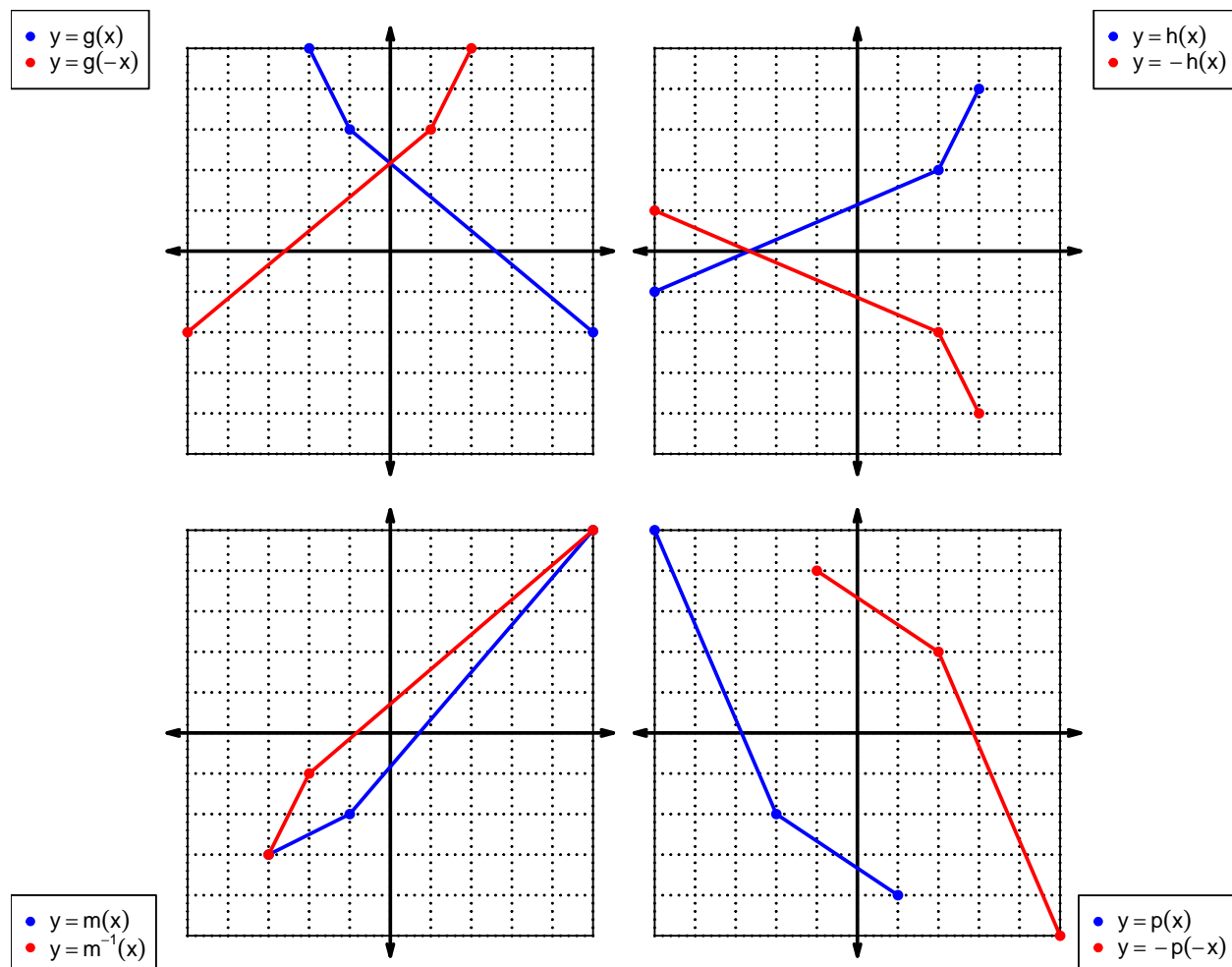
Draw lines that match each function reflection with its polynomial:

Reflections

Polynomials

$-f(-x)$	●	●	$3x^4 + 9x^3 + 5x^2 + 4x + 6$
$-f(x)$	●	●	$3x^4 - 9x^3 + 5x^2 - 4x + 6$
$f(-x)$	●	●	$-3x^4 + 9x^3 - 5x^2 + 4x - 6$

2. In each  $xy$  plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The  $x$  axis is horizontal and the  $y$  axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions  $f$ ,  $g$ , and  $h$  are defined by the table below.

$x$	$f(x)$	$g(x)$	$h(x)$
1	7	6	2
2	9	1	9
3	6	4	7
4	5	7	6
5	3	8	1
6	2	9	8
7	8	5	4
8	1	2	3
9	4	3	5

3. Evaluate  $g(7)$ .

$$g(7) = 5$$

4. Evaluate  $h^{-1}(2)$ .

$$h^{-1}(2) = 1$$

5. Assuming  $f$  is an **odd** function, evaluate  $f(-6)$ .

If function  $f$  is odd, then

$$f(-6) = -2$$

6. Assuming  $g$  is an **even** function, evaluate  $g(-4)$ .

If function  $g$  is even, then

$$g(-4) = 7$$

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7. A function,  $f$ , is **even** if  $f(x) = f(-x)$  for all  $x$  in the domain. A function,  $g$ , is **odd** if  $g(x) = -g(-x)$  for all  $x$  in the domain.

Let polynomial  $p$  be defined with the following equation:

$$p(x) = x^2 + x$$

- a. Express  $p(-x)$  as a polynomial in standard form.

$$p(-x) = (-x)^2 + (-x)$$

$$p(-x) = x^2 - x$$

- b. Express  $-p(-x)$  as a polynomial in standard form.

$$-p(-x) = -(x^2 - x)$$

$$-p(-x) = -x^2 + x$$

- c. Is polynomial  $p$  even, odd, or neither?

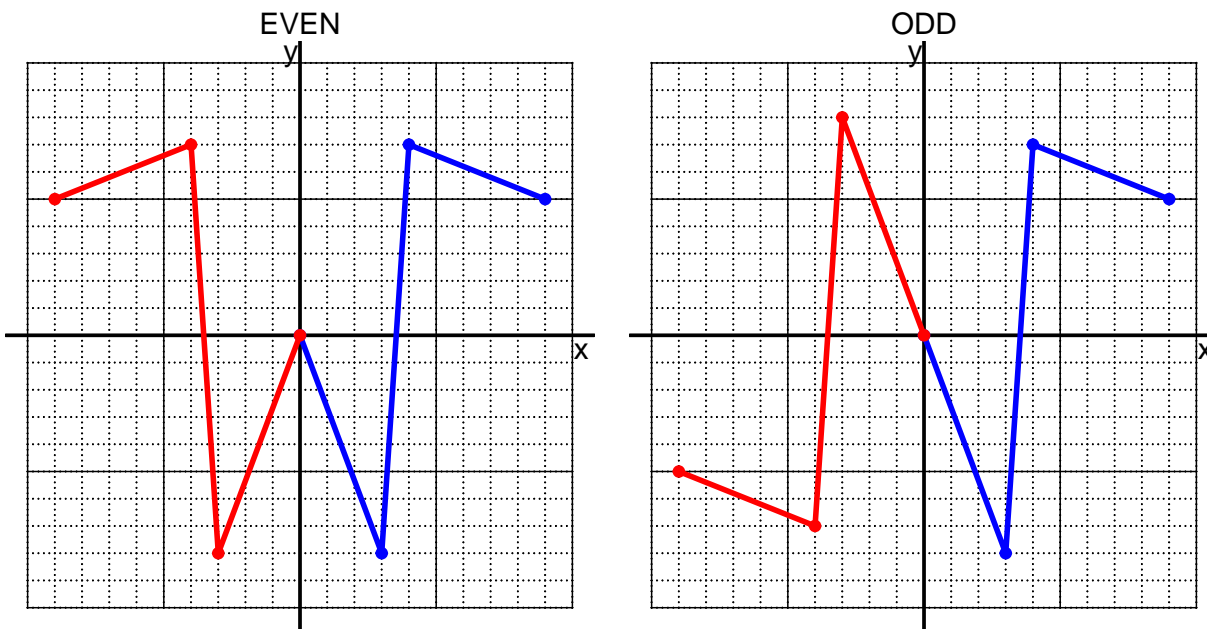
neither

- d. Explain how you know the answer to part c.

We see that  $p(x)$  is not equivalent to either  $p(-x)$  or  $-p(-x)$ , so  $p$  is neither even nor odd.

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8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function  $f$  be defined with the equation below.

$$f(x) = 6x - 5$$

- a. Evaluate  $f(13)$ .

step 1: multiply by 6  
step 2: subtract 5

$$f(13) = 6(13) - 5$$

$$f(13) = 73$$

- b. Evaluate  $f^{-1}(85)$ .

step 1: add 5  
step 2: divide by 6

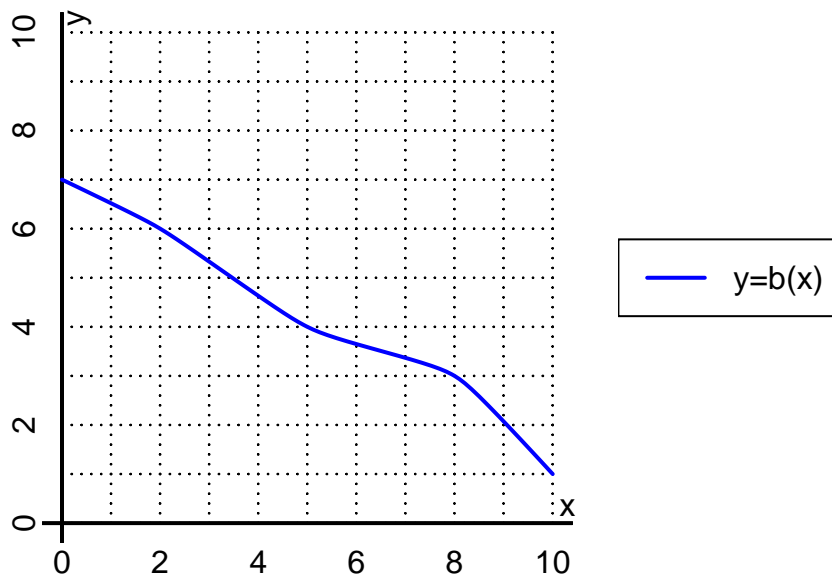
$$f^{-1}(x) = \frac{x + 5}{6}$$

$$f^{-1}(85) = \frac{(85) + 5}{6}$$

$$f^{-1}(85) = 15$$

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10. The function  $b$  is represented by the curve  $y = b(x)$  graphed below.



a. Evaluate  $b(5)$ .

$$b(5) = 4$$

b. Evaluate  $b^{-1}(3)$ .

$$b^{-1}(3) = 8$$

## Exam: Function Reflections (practice version 0)

11. Function  $f$  is defined by the table below.

a. Complete the columns for  $-f(x)$  and  $f(-x)$  and  $-f(-x)$ .

$x$	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	5	-5	5	-5
-1	-3	3	-3	3
0	0	0	0	0
1	-3	3	-3	3
2	5	-5	5	-5

b. Is function  $f$  even, odd, or neither?

even

c. How do you know the answer to part b?

Function  $f$  is even because column  $f(-x)$  matches column  $f(x)$  exactly.